The Amazon River Basin as an Analog for the Pre-Ice Age Bell River Basin of North America

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**THE AMAZON RIVER BASIN AS AN ANALOG FOR THE PRE-ICE AGE BELL RIVER BASIN OF NORTH AMERICA**

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### Introduction

- The pre-ice age Bell River basin of North America was comparable in size to the modern day Amazon basin of South America.
- 2.5 million years ago, continental glaciers re-routed the paths of the tributaries in Canada, leaving behind traces of this once massive river basin in headwater valleys in the Rocky Mountains and in a giant river delta in the Labrador Sea
- Both systems had headwaters in high mountains and canyons, then drained across flat, continental-scale basins, and emptied into the Atlantic Ocean through broad continental rift zones.
- Both have large deltas and long submarine turbidity channels.

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### The Amazon River Basin as an Analog for the Pre-Ice Age Bell River Basin of North America

#### Amazon Delta
- >8 km thick
- Largest sedimentary depocenter on the Atlantic seaboard of South America
- Beheaded at Hudson Straight by continental glaciation

#### Sagkek Delta
- >8 km thick
- Largest sedimentary depocenter on the Atlantic seaboard of North America
- Beheaded at Hudson Straight by continental glaciation

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### The Rivers and their Basins

- **Amazon drainage basin area:** approx. 6,900,000 km²
- **Bell River drainage basin area:** approx. 7,050,000 km²
- **Amazon River length:** approx. 6,400 km
- **Proposed Bell River length:** approx. 6,000 km

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### River Gradient Comparison

Profiles of the Amazon River gradient (above) and the current gradient of the path once taken by the ancient Bell River (below).

- The Amazon River has a low gradient (roughly 2 centimeters per kilometer of horizontal distance) once it leaves its headwaters in the Andes Mountains. For more than two thirds of its course the river stays within 100 meters of sea level.
- The current gradient of the path once taken by the ancient Bell River is the result of 2.5 million years of tectonics, volcanism, isostacy and erosion.
- The Amazon River profile provides the best indication of what the Bell River profile was before being re-routed by continental glaciation. This can help to estimate fluvial patterns of the ancient Bell River.
- Additionally, comparisons of the two gradients could augment studies of the magnitude of tectonic uplift in the last 2.5 million years.

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### Practical Applications

- Strong evidence exists that the Pre-Ice Age Bell River and the modern Amazon River drained similar size basins, moved similar sediment loads and flowed for similar distances.
- Understanding the dynamics of the Amazon River could help augment studies of the Pre-Ice Age Bell River.
- Comparing river gradient profiles between the modern day Amazon and Pre-Ice Age Bell River can supplement studies of tectonic displacements in the western interior, the effects of Yellowstone volcanism, and faulting in the Great Basin.